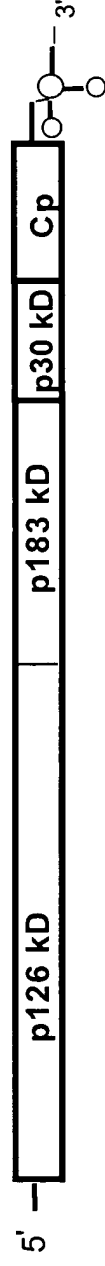


FIG. 1

Tobamovirus Expression Vectors

TM V



TM V-Expression Vector

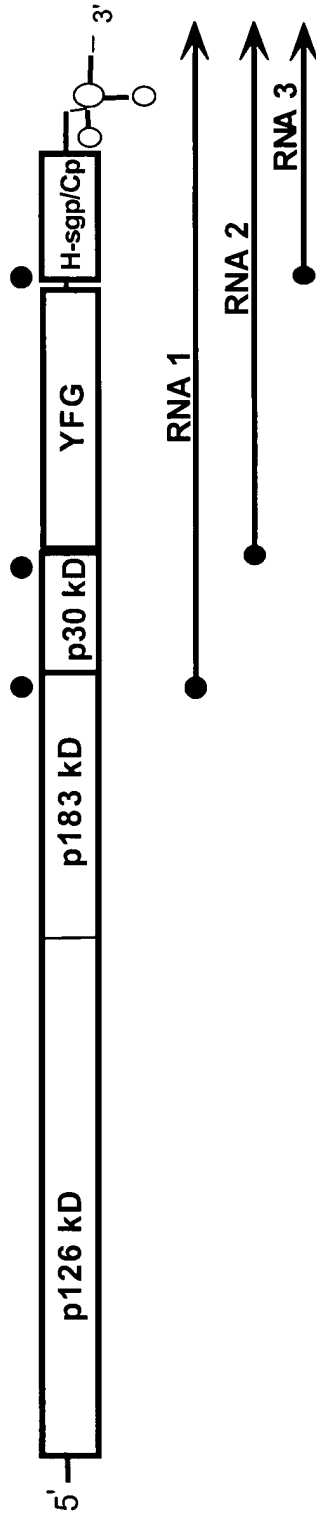


FIG. 2

Tobamovirus Vector for rGal-A Expression

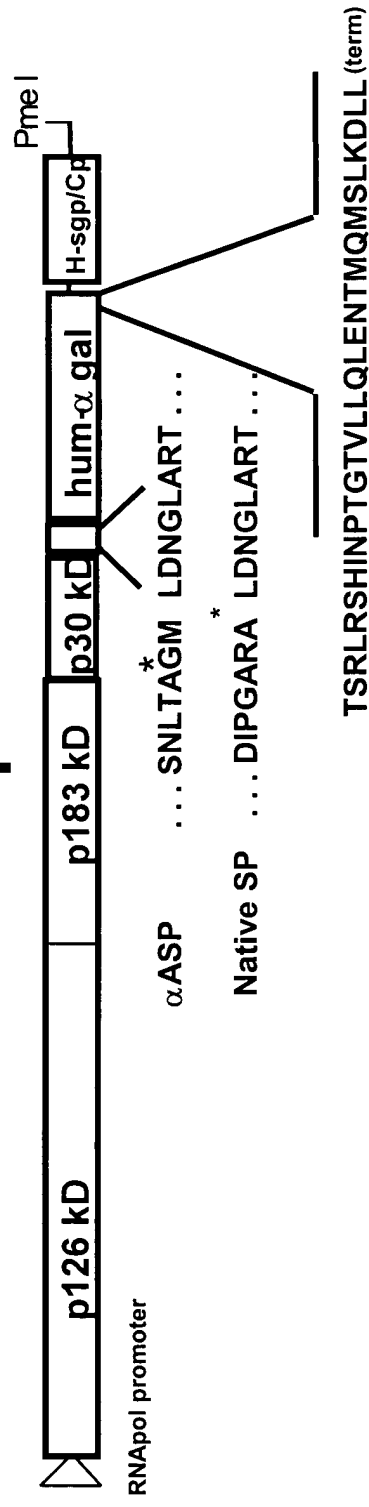


FIG. 3
Accumulation and Activity of WT rGal-A

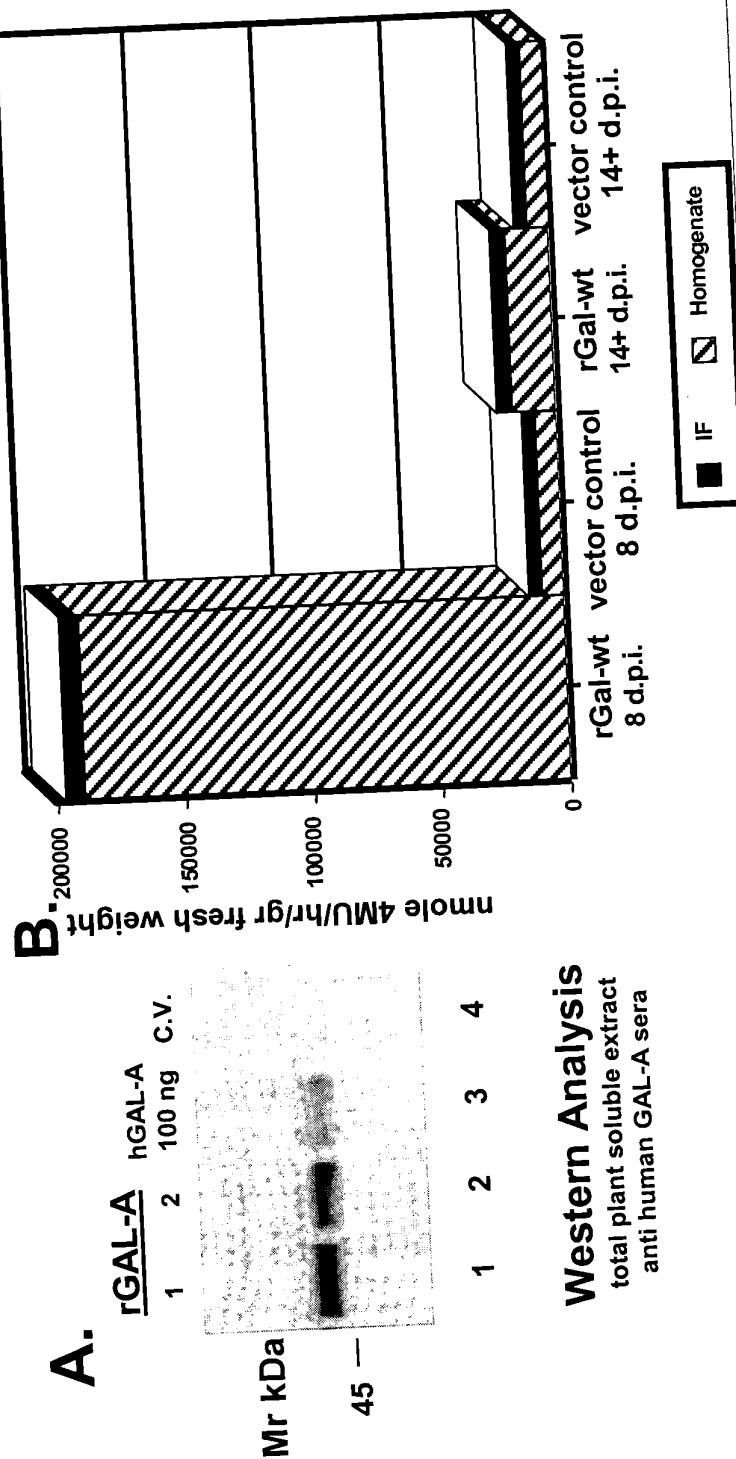


FIG. 4
Accumulation and Activity
of WT and ER-Targeted rGal-A

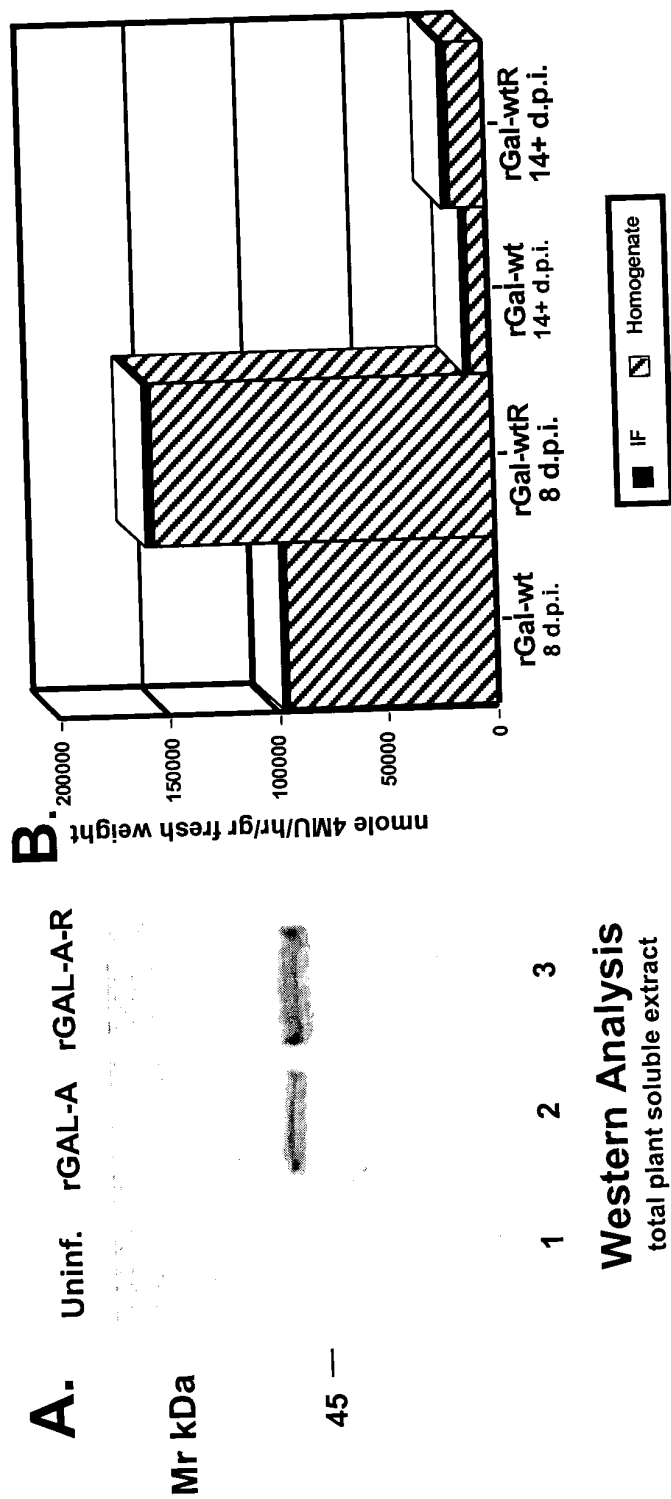


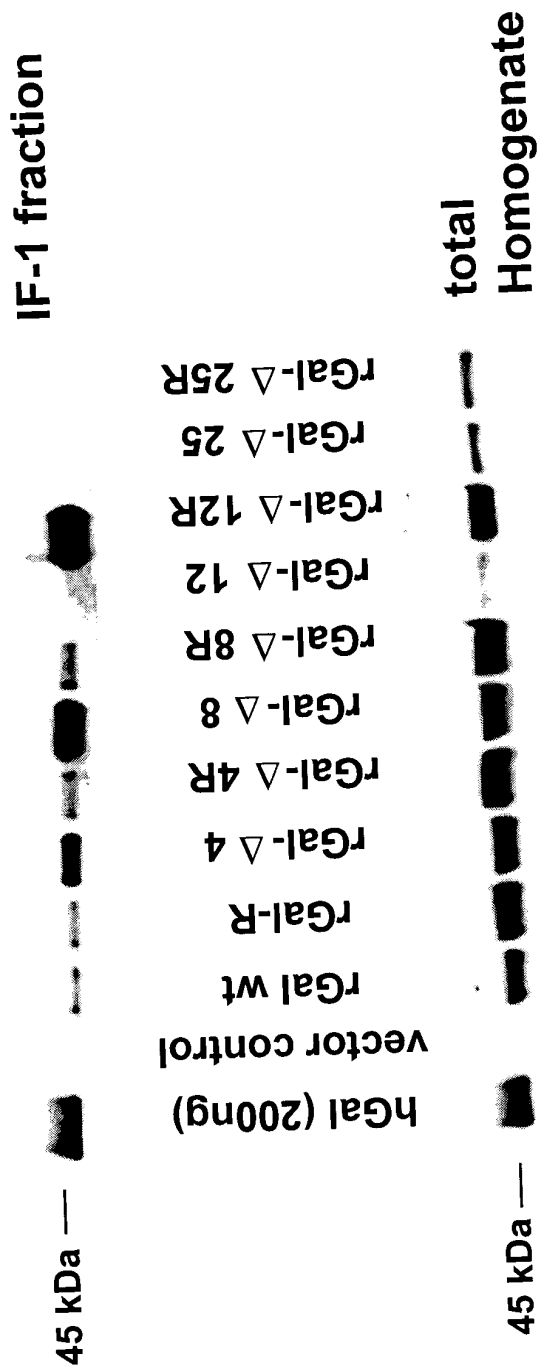
FIG. 5 **Carboxy-Modifications to rGal-A**

	-30	-20	-10
WT			*TSRLRSHINPTGTVLLQLENTMQMSLKDLL
WTR			TSRLRSHINPTGTVLLQLENTMQMSLKDLLSEKDEL
Δ4			TSRLRSHINPTGTVLLQLENTMQMSL
Δ4R			TSRLRSHINPTGTVLLQLENTMQMSLSEKDEL
Δ8			TSRLRSHINPTGTVLLQLENTM
Δ8R			TSRLRSHINPTGTVLLQLENTMSEKDEL
Δ12			TSRLRSHINPTGTVLLQL
Δ12R			TSRLRSHINPTGTVLLQLSEKDEL
Δ25			TSRLR
Δ25R			TSRLRSEKDEL

Control virus (GFP, AMP, IFN g)

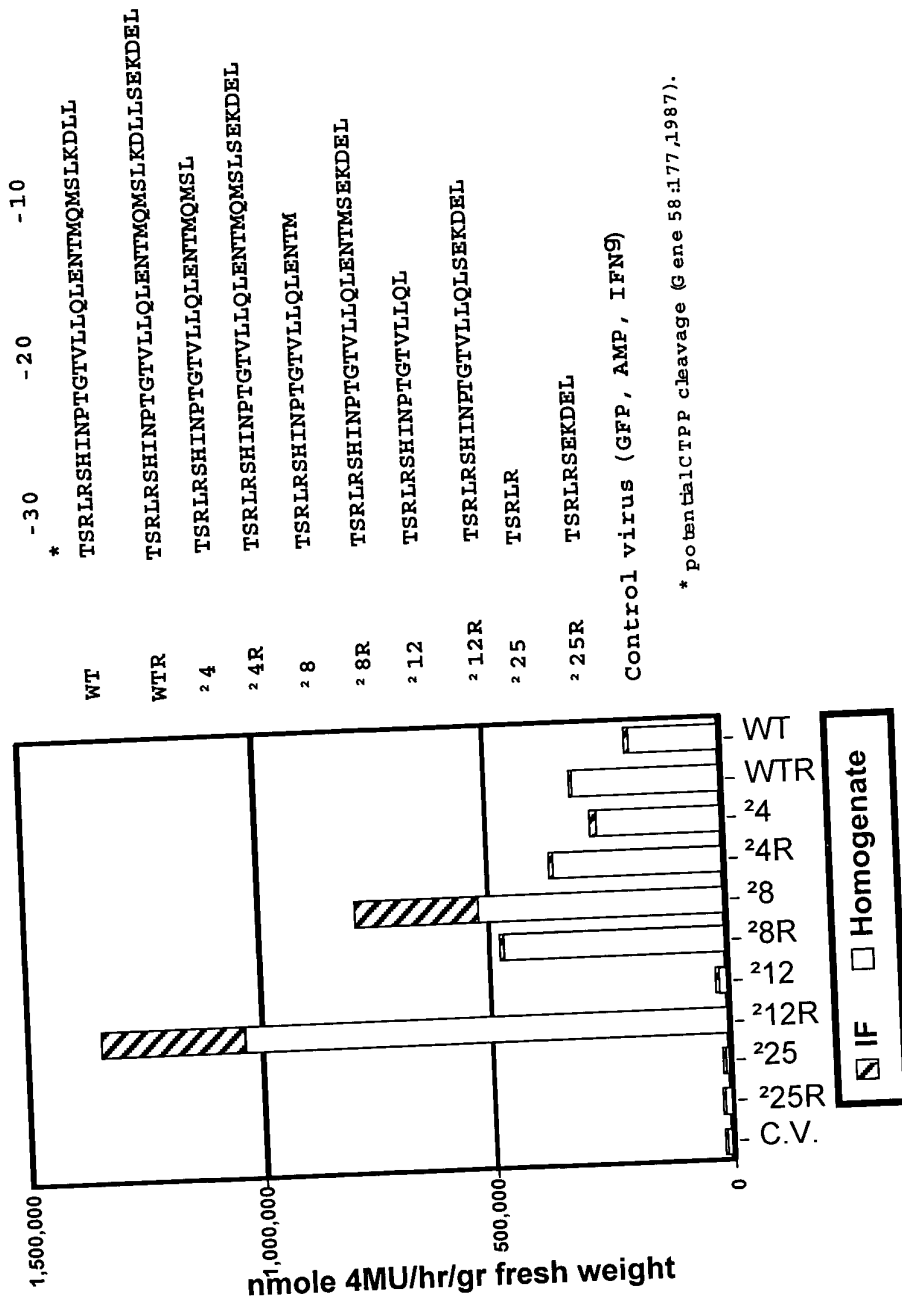
* potential CTPP cleavage (Gene 58:177,1987) .

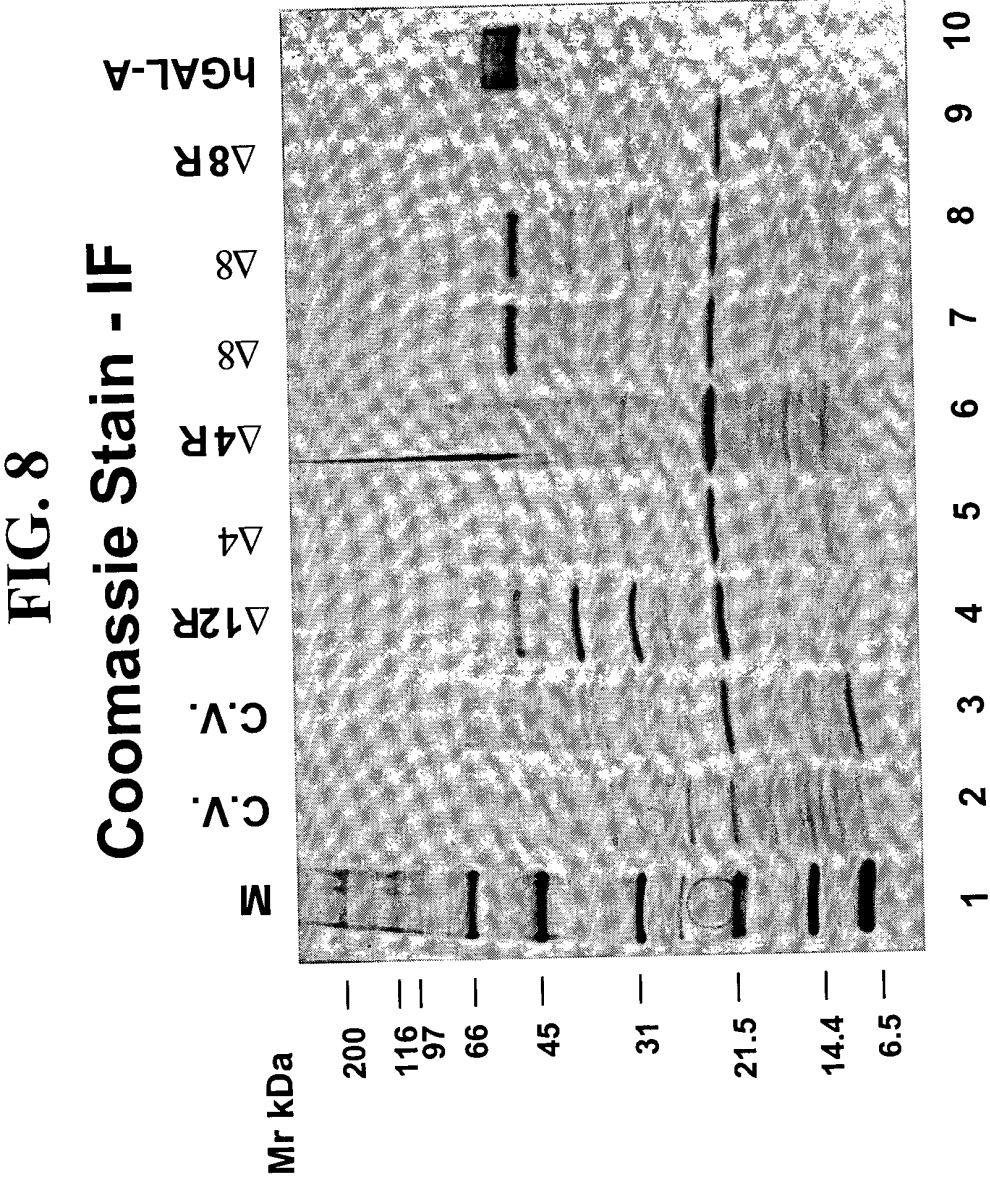
FIG. 6
Western Blot Analysis of
Carboxy-modified rGal-A



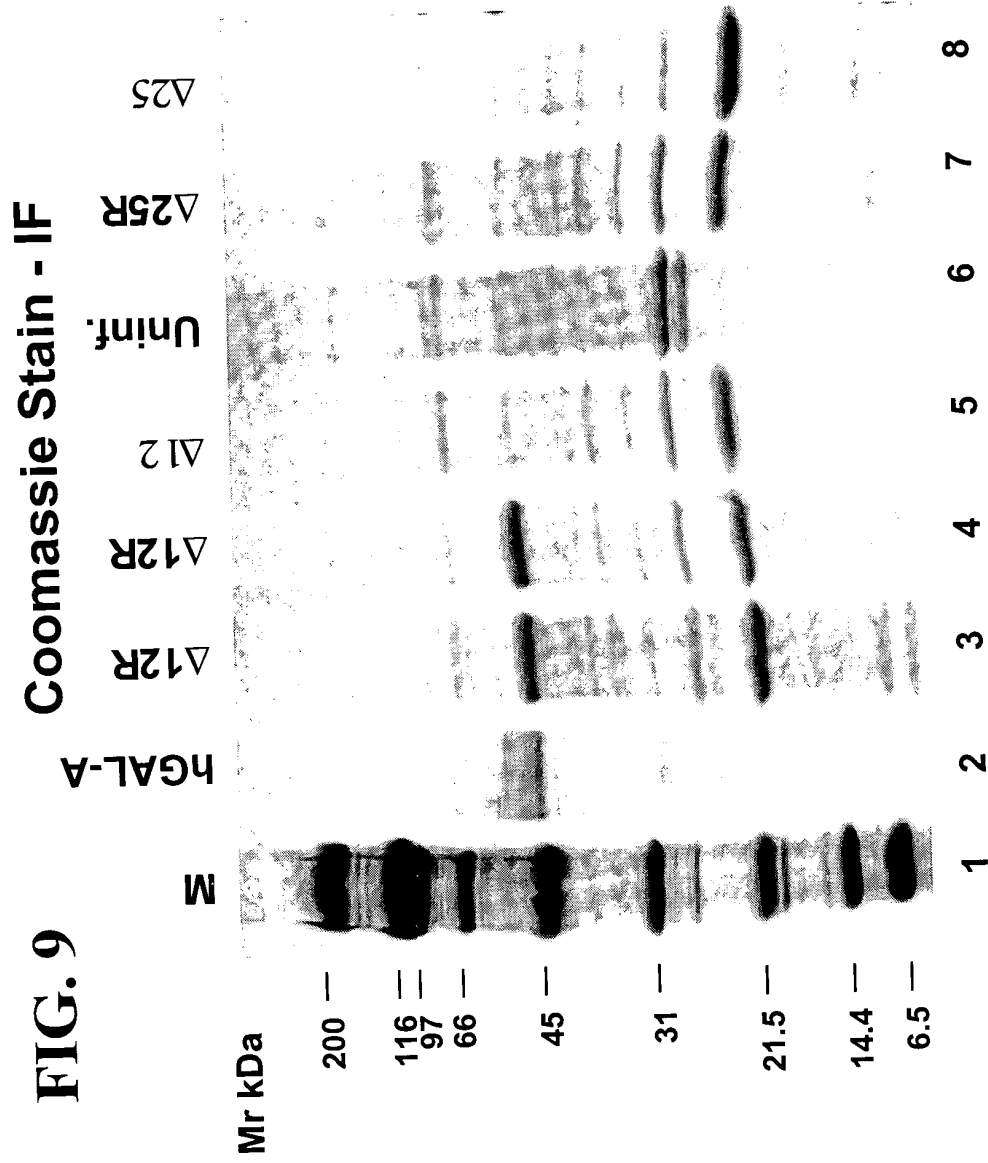
BEST AVAILABLE COPY

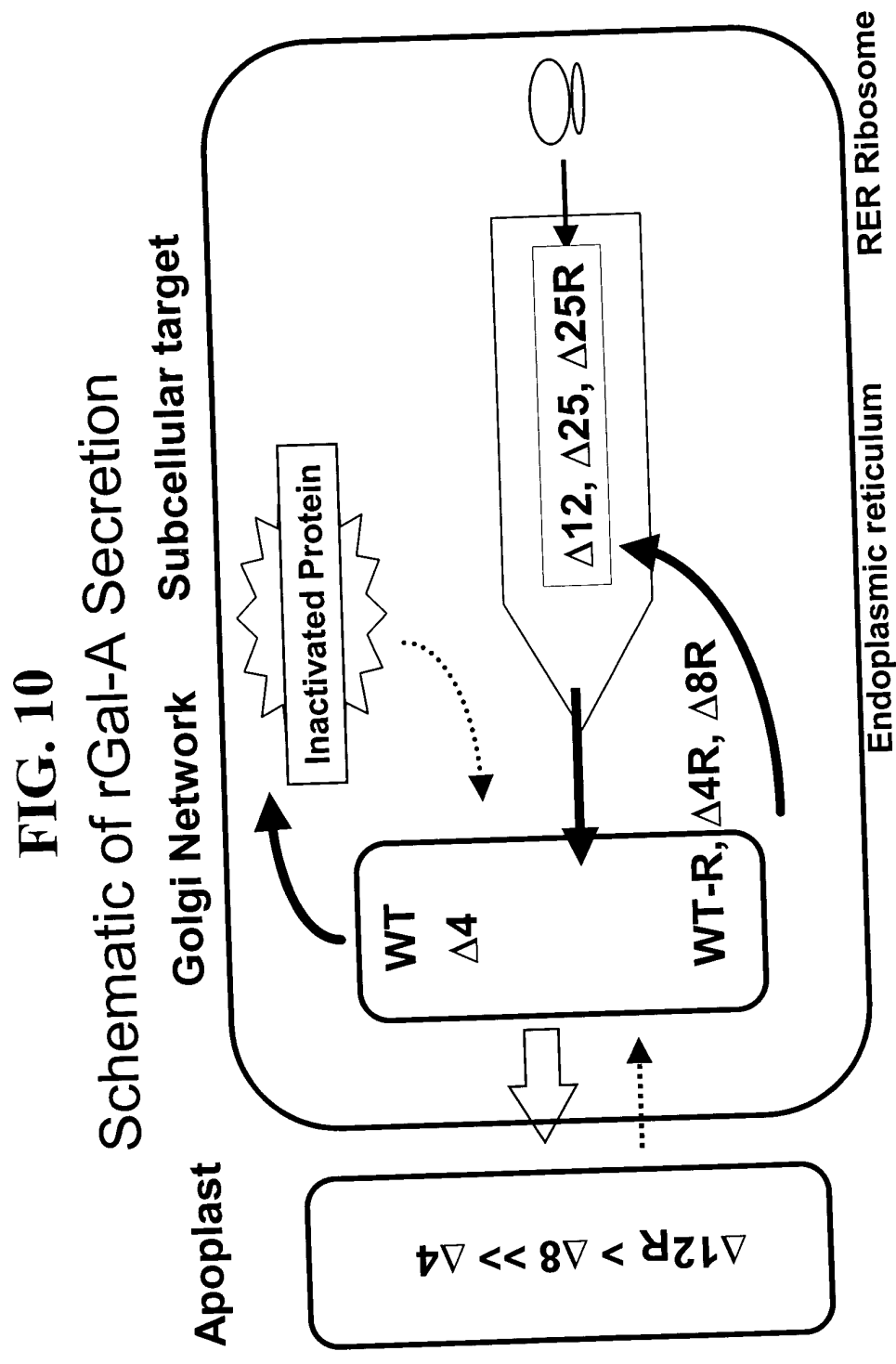
FIG. 7
Enzymatic Activity of Carboxy-Modified rGal-A





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FIG. 12-1

GTATTTTACAACAATTACCAACAACAACAACAACAACATTACAATTACTATTTACAATTACAATGGCATAACACA
CAGACAGCTACCATCAGCTTTGCTGGACACTGTCCGAGGAAACAACCTCCTGGTCAATGATCTAGCAAAGCGTCTCT
TTACGACACAGCGGTTGAAGAGTTTAAACGCTCGTGACCGCAGGCCCAAGGTGAACCTTTTCAAAAGTAATAAGCGAGGAGC
AGACGCTTATTGCTACCCGGGCGTATCCAGAATTCAAAATTACATTTTATAACACGCAAAATGCCGTGCATTGCTTGCA
GGTGGATTGCGATCTTTAGAAGTGAATATCTGATGATGCAAAATCCCTACGGATCATTGACTTATGACATAGGCGGGAA
TTTTGCATCGCATCTGTTCAAGGGACGAGCATATGTACACTGCTGTATGCCCAACCTGGACGTTCCGAGACATCATCGGC
ACGAAGGCCAGAAAGACAGTATTGAACATACCTTTCTAGGCTAGAGAGAGGGGGGAAACAGTCCCCAACCTTCCAAAAG
GAAGCATTGACAGATACGCAGAAATTCCTGAAGACGCTGTCTCACAATACTTTCCAGACAATGCGACATCAGCCGAT
GCAGCAATCAGGCAGAGTGTATGCCATTGCGCTACACAGCATATATGACATACCAGCCGATGAGTTCGGGGCGGCACTCT
TGAGGAAAAATGCCATACGTGCTATGCCGCTTTCCACTTCTCTGAGAACCTGCTTCTTGAAGATTACATGCAATTG
GACGAAATCAACGCGTGTTTTTCGCGCGATGGAGACAAGTTGACCTTTTCTTTGCATCAGAGAGTACTCTTAATTATTG
TCATAGTTATTCTAATATCTTAAGTATGTGTGCAAACTTACTTCCCGGCTCTAATAGAGAGGTTTACATGAAGGAGT
TTTTAGTCACCGAGTTAATACCTGGTTTGTGAAGTTTCTAGAATAGATACTTTCTTTTGTACAAAGGTGTGGCCAT
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CGAGAGAATCCTCCTTGAGGATTATCATCAGTCAATTACTGGTTTCCCAAAATGAGGGATATGGTCATCGTACCATTAT
TCGACATTTCTTTGGAGACTAGTAAGAGGACGCGAAGGAAGTCTTAGTGTCCAAGGATTTCGTGTTACAGTGCTTAAC
CACATTCGAACATACCAGGCGAAAGCTCTTACATACGCAATGTTTTGTCTTTGTGCAATCGATTGATCGAGGGTAAT
CATTACCGTGTGACAGCGAGGTCGAATGGGATGTGGACAATCTTTGTTACAATCCTTGTCCATGACGTTTACCTGC
ATACTAAGCTTGGCCTTCTAAGGATGACTTACTGATTAGCAAGTTAGTCTCGGTTTCAAAAACGGTGTGCCAGCATGTG
TGGGATGAGATTTCTGCTGGCGTTTGGGAACGCATTTCCCTCGTGAAAGAGAGGCTCTTGAACAGGAACTTATCAGAGT
GGCAGGCGACGCATTAGAGATCAGGGTGCCTGATCTATATGTGACCTTCCACGACAGATTAGTACTGAGTACAAGGCCCT
CTGTGGACATGCTGCGCTTACATTAGAAGAAGATGGAAGAAACGGAAGTGTATGACATGCAATGCACTTTCAGAGTTATCG
GTGTTAAGGGAGTCTGACAAATTCGATGTTGATGTTTTTCCAGATGTGCAATCTTTGGAAGTTGACCAATGACCGGC
AGCGAAGGTTATAGTCGCGGTCTAGAGCAATGAGAGCGGTCTGACTCTCACATTGAACGACCTACTGAGGCGAATGTTG
CGCTAGCTTTACAGGATCAAGAGAAGGCTTCAAGAGTGCTTTGGTAGTTACCTCAAGAGAAGTTGAAGAACCCTCCATG
AAGGTTTCGATGGCCAGAGGAGATTACAATTAGCTGGTCTTGTGGAGATCATCCGAGTCTGCTCTTCTAAGAACGA
GGAGATAGAGTCTTTAGAGCAGTTTCATATGGCAACGCGAGATTCTGTTAATTCGTAAGCAGATGAGCTCGATTGTGTACA
CGGTCGGAATTAAGTTTCAAGCAATGAAAACTTTATCGATAGCCTGGTAGCATCACTATCTGCTGCGGTGTGCAATCTC
GTCAAGATCCTCAAAGATACAGCTGCTATTGACCTTGAACCCGTCAAAAGTTGGAGTCTTGGATGTTGCATCTAGGAA
GTGGTTAATCAAAACCAACGGCCAAGAGTCAATGATGGGGTGTGTTGAACCCACGCGAGGAAGTATCATGTGGCGCTT
TGGAATATGATGAGCAGGGTGTGGTGACATGCGATGATTGAGAAGAGTAGCTGTGAGTCTGTTGTTTATTCC
GACATGGCGAAACTCAGAACTCTGCGCAGACTGCTTCAAAACGAGAACCGCATGTGAGTACGCAAGGTTGTTCTTGT
GGACGGAGTTCGGGCTGTGGGAAAACCAAGAAATCTTCCAGGGTTAATTTTGATGAAGATCTAATTTTAGTACCTG
GGAAGCAAGCCGCGAAATGATCAGAAGACGTGCGAATTCCTCAGGGATTATTGTGGCCACGAAGGACAACGTTAAAAAC
GTTGATTCTTTCATGATGAATTTTGGGAAAAGCACACGCTGTGAGTTCAAGAGGTTATTCTATTGATGAAGGGTTGATGTT
GCATATGTTGTTGTTAATTTTCTTGTGGCGATGTCATTGTGCGAAATGCATATGTTTACGAGAGACACACAGCAGATT
CATACATCAATAGAGTTTCAGGATTCCCGTACCCGCCCCATTTTGCCAAATGGAAGTTGACGAGGTGGAGACACGCAGA
ACTACTCTCGTTGTCCAGCCGATGTACACATTATCTGAACAGGAGATATGAGGGCTTTGTCATGAGCACTTCTTCGGT
TGACTTTTACCAATCGGATAAAGAAGCTCTGCTTTCAAGAGGGTATTAGATGTTTACACATGTGCATGAAGTGCAAGGC
GAGACATACTCTGATGTTTCACTAGTTAGGTTAAACCCCTACACAGTCTCCATCATTCAGGAGACAGCCACATGTTT
GGTCGCATTGTCAAGGCACACCTGTTGCTCAAGTACTACACTGTTGTTATGGATCCTTTAGTTAGTATCATTAGAGATC
TAGAGAACTTAGTCTGTAATTTGATATGTATAAGTTCGATGCAGGAACACAATAGCAATTACAGATTGACTCGGTG
TTCAAAGGTTCCAATCTTTTGTGTCAGCGCCAAAGACTGGTGATATTTCTGATATGCAGTTTACTATGATAAGTGTCT
CCCAGGCAACAGCACCATGATGAATAATTTTGTGCTGCTTACCATGAGGTTGACTGACATTTCAATTGAATGTCAAAGATT
GCATATTTGGATATGCTAAGTCTGTTGCTGCGCTAAGGATCAATCAAACTAATACCTATGGTACGAACGCGCGCA
GAAATGCCACGCGAGACTGACTATTGGAAAAATTTAGTGGCGATGATTAAAGGAACTTTAACGCACCCGAGTTGTCTGG
CATCATGATATTGAAAAATCTGCATCTTTAGTTGTAGATAAGTTTTTGTAGTTATTGCTTAAAGAAAAAGAAAAAC
CAAATAAAAAATGTTTCTTTGTTTCACTAGAGAGTCTCTCAATAGATGTTTGAAGAGCAGGAACAGGTAACAATAGGCCAG
CTCGCAGATTTGATTTTGTAGATTGTCAGCAGTTGATCAGTACAGACATGATTAAAGCACAACCCCAAGCAAAAAAT
GGACACTTCAATCCAAACGAGTACCCGCTTTGTCAGACGATTGTGTACCATTCAAAAAAGATCAATGCAATATTTGGCC
CGTTGTTTAGTGAGCTTACTAGGCAATTACTGGACAGTGTGATTCCGAGCAGATTTTGTTTTTCACAAGAAAGACCA
GCGCAGATTGAGGATTCTTCGGAGATCTCGACAGTCAATGTGCGGATGGATGTTTGGAGCTGGATATATCAAAATACGA

FIG. 12-2

CAAACTCTCAGAATGAATCCACTGTGCAGTAGAATACGAGATCTGGCGAAGATTGGGTTTGAAGACTTCTTGGGAGAAAG
TTTGGAAACAAGGCATAGAAAGACCACCTCAAGGATTATACCGCAGGTATAAAACTTGCATCTGGTATCAAAGAAAG
AGCGGGGACGTCACGACGTTTATTGGAACACTGTGATCATGTGTCATGTTTGGCCTCGATGCTTCCGATGGAGAAAAAT
AATCAAAGGAGCCTTTTGGCGTGACGATAGTCTGCTGTACTTCCAAAGGGTGTGAGTTTCCGGATGTGCAACACTCCG
CGAATCTTATGTGGAATTTTGAAGCAAACTGTTTAAAAAACAGTATGGATACTTTTGGCGAAGATATGTAATACATCAC
GACAGAGGATGCATTGTGTATTACGATCCCCCTAAAGTTGATCTCGAACTTGGTGCTAAACACATCAAGGATTGGGAACA
CTTGGAGGAGTTTCAAGAGTCTCTTTGTGATGTGCTGTTTCGTTGAACAATTGTGCGTATTACACACAGTTGGACGACG
CTGTATGGGAGGTTTCAAGACCGCCCCCTCCAGGTTTCGTTTGTATTTTAAAGGAAAGTGAATATCAATGAGTTTATCGACCTGACAAAAA
CTTTTATAGAAGTTTGTATAGATGGCTCTAGTTGTTAAAGGAAAGTGAATATCAATGAGTTTATCGACCTGACAAAAA
TGGAGAAGATCTTACCGTCGATGTTTACCCCTGTAAGAGTGTATGTGTTCCAAAGTTGATAAAATAATGGTTCATGAG
AATGAGTCATGTGTCAGAGGTGAACCTTCTTAAAGGAGTTAAGCTTATTGATAGTGGATACGTCTGTTAGCCGGTTTGGT
CGTCACGGGCGAGTGGAACTTGCCTGACAATTGCAGAGGAGGTGTGAGCGTGTCTGGTGGACAAAAGGATGGAAAGAG
CCGACGAGGCCACTCTCGGATCTTACTACACAGCAGCTGCAAGAAAGAGATTTCAAGTTCAGAGTCGTTCCCAATTATGCT
ATAACCAACCCAGGACGCGATGAAAAACGCTGGCAAGTTTATGTTAATATTAGAAATGTGAAGATGTGAGCGGTTTCTG
TCCGCTTTCTGAGGTTTGTGTCGGTGTGATTGTTTATAGAAATAATATAAAATAGGTTTGAGAGAGAAGATTACAA
ACGTGAGAGACGGAGGGCCCATGGAACCTTACAGAAGAAGTGTGATGAGTTCATGGAAGATGTCCCTATGTGATCAGG
CTTGCAAGTTTCGATCTCGAACCAGGAAAAAGAGTGTGTCGCAAGGGAAAAATAGTAGTAATGATCGGTGAGTGCC
GAACAAGAACTATAGAAATGTTAAGGATTTTGGAGGAATGAGTTTAAAAAGAATAATTTAATCGATGATGATTGCGAGG
CTACTGTGCGCAATCGGATTCGTTTAAATAGATCTTACAGTATCACTACTCCATCTCAGTTCGTTCTGTCTGTCTTAA
TATGTCAGGTGCTGAACACCATGGTGAACAAACACTTCTTGTCCCTTTCCGTCCTCATCGTCTCTTGGCCTCTCTCCA
ACTTGACAGCCGCGATGCTGGACAATGGATTGGCAAGGACGCTACCATGGGCTGGCTGCACTGGGAGCGCTTCATGTGC
AACCTTGACTGCCAGGAAGAGCCAGATTCTGTCATCAGTGAGAAGCTCTTCATGGAGATGGCAGAGCTCATGGTCTCAGA
AGGCTGGAAGGATGCAAGGTTATGAGTACCTCTGCATTGATGACTGTTGGATGGCTCCCCAAGAGATTGAGAAGGACAC
TTGAGGACAGCCCTCAGCGCTTCTCATGGGATTGCGCAGGCTTCCCTGGGAGTTTGGATACTACGACATTGATGCCAGACCTT
TGCTGACTGGGAGTAGATCTGCTAAAATTTGATGGTGTGTTACTGTGACAGTTTGGAAAAATTTGGCAGATGGTTATAAGC
ACATGTCTTGGCCCTGAATAGGACTGGCAGAAGCATTGTGTACTCTGTGAGTGGCCTCTTATATGTGGCCCTTTCAA
AAGCCCAATTATACAGAAATCCGACAGTACTGCAATCACTTGGCGAAATTTGTGACATTGATGATTCTGGAAGATAT
AAAGAGTATCTTGGACTGGACATCTTTTAAACAGGAGAGAATTGTTGATGTTGCTGGACAGGGGGTTGGAATGACCCAG
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CCTTTATTCTATGCTAATGACCTCCGACACATCAGCCCTCAAGCCAAAGCTCTCCTTCAGGATAAGGACGTAATTGGCAT
CAATCAGGACCCCTTGGGCAAGCAAGGTACCAGCTTAGACAGGGAGACAACCTTGAAGTGTGGGAACGACCTCTCTCAG
GCTTAGCCTGGGCTGTAGCTATGATAAACCGGAGGAGATTGGTGGACCTCGCTCTTATACCATCGCAGTTGCTTCCCTG
GGTAAAGGAGTGGCCTGTAATCCTGCTGCTTCATCACACAGCTCCTCCTGTGAAAAGGAAGCTAGGGTTCTATGAATG
GACTTCAAGGTTAAGAAGTCACATAAATCCCAAGGCACTGTTTGTCTCAGCTAtctgaaaaggacgaattatgaCCTA
GGCTCGCAAAGTTTCAACCAAAATCCTCAAAAAGAGGTCCGAAAAATAATAAATTTAGGTAAGGGGCGTTGAGCGGA
AGGCTTAAACCAAAAAGTTTGTGATGAAGTTGAAAAAGAGTTTGATAATTTGATTGAAGATGAAGCCGAGACGTCGGTTCG
GGATTCTGATTCTGATTAAATATGTCTTACTCAATCACTTCTCCATCGCAATTTGTGTTTTTGTGATCTGATGGGCTGA
CCCTATAGAATTGTTAAACGTTTGTACAAATTCGTTAGGTAACAGTTTCAACACAGCAAGCAAGAACTACTGTTCAAC
AGCAGTTTACGAGGTTGGAACCTTTCCCTCAGAGCACCGTCAGATTTCTTGGCGATGTTTATAAGGTGTACAGGTAC
AATGCAGTTTATAGATCCTCTAATTACTGCGTTGTCTGGGGGCTTTTGATACAGGAATAGAATAATCGAAGTAGAAAAACA
GCAGAGTCCGACACAGCTGAAACGTTAGATGCTACCCGAGGGTAGACGACGCTACGGTTGCAATTCCGTCTGCTATAA
ACCTCTGCACCTGCATCTTAAATGCATAGGTGCTGAAATATAAAGTTTGTGTTTCTAAAACACAGTGGTACGTACGATA
ACGTACAGTGTTTTTCCCTCCACTTAAATCGAAGGTAGTGTCTGGAGCGCGCGAGTAAACATATATGGTTTCATATAT
GTCCGTAGGCACGTAAGAAAGCGAGGGATTGCAATTTCCCGGAACCCCGGTTGGGGCCAGGTACCAATTCTTGAAG
ACGAAAGGGCTCGTGATACGCTATTTTTATAGGTTAATGTGATGATAATAATGGTTTCTTAGACGTCAGGTGGCACTT
TTCGGGGAATGTGCGCGGAACCCCTATTGTTTATTTTCTAAATACATTCAAATATGATCCGCTCATGAGACAATAA
CTCTGATAAATGCTTCAATAATATTGAAAAAGGAAGAGTATGAGTATCAACATTTCCGTGTGCGCTTATTTCCCTTTTT
TGCGGCATTTTGCTTCTGTTTTGCTCAGCCAGAAACGCTGGTGAAGTAAAAGATGTGAAGATCAGTTGGGTGCAC
GAGTGGGTTACATCGAAGTGGATCTCAACAGCGGTGAAGTCTTGAAGTTTTCGCCCCGAGAAGCGTTTTTCAATGATG
AGCACTTTTAAAGTTCTGCTATGTGCGCGGTATTATCCGTTGTGACGCGGGCAAGAGCAACTCGGTGCGCGCATACA
CTATTCTCAGAATGACTTGGTTGAGTACTACCAGTCACAGAAAAGCATCTTACGGATGGCATGACAGTAAGAGAATTAT

FIG. 12-3

GCAGTGCTGCCATAACCATGAGTGATAAACTGCGGCCAACTTACTTCTGACAAAGATCGGAGGACCGAAGGAGCTAACC
GCTTTTGGCACACATGGGGGATCATGTAACCTCGCCTTGATCGTTGGGAACCGGAGCTGAATGAAGCCATACCAAACGA
CGAGCGTGACACCACGATGCCCTGCAGCAATGGCAACAACGTTGCCCAAATATTAAGTGGCGAACTACTTACTCTAGCTT
CCCGGCAACAATTAATAGACTGGATGGAGGCGGATAAAGTTGCAGGACCACTTCTGCGCTCGGCCCTCCGGCTGGCTGG
TTTATTGCTGATAAACTCGGAGCCGGTGAGCGTGGGTCTCGCGGTATCATTGACGACTGGGGCCAGATGGTAAGCCCTC
CCGTATCGTAGTTATCTACACGACGGGGAGTCAGGCAACTATGGATGAACGAAATAGACAGATCGCTGAGATAGGTGCCCT
CACTGATTAAGCATTGGTAACTGTCAGACCAAGTTTACTCATATATACTTTAGATTGATTTAAAACTTCATTTTAAATT
AAAAGGATCTAGGTGAAGATCCTTTTGATAATCTCATGACCAAAATCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTC
AGACCCCGTAGAAAAGATCAAAGGATCTTCTGAGATCCTTTTCTGCGCGTAATCTGCTGCTTGCAAACAAAAAAC
CACCGCTACCAGCGTGGTTGTGTTGCCGGATCAAGAGCTACCAACTCTTTTCCGAAGGTAACCTGGCTTCAGCAGAGCG
CAGATACCAAATACTGTCTTCTAGTGTAGCCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCCTACATACTT
CGCTCTGCTAATCCTGTTACCACTGGCTGCTGCCAGTGGCGATAAGTCGTGCTTACCGGTTGGACTCAAGACGATAGT
TACCGGATAAGGCGCAGCGGTGAGCGGTGAACGGGGGTTCTGTCACACAGCCCAGCTTGGAGCGAACGACCTACACCGAA
CTGAGATACCTACAGCGTGAGCTATGAGAAAGCGCCACGCTTCCCGAAGGAGAAAGGCGGACAGGTATCCGGTAAGCGG
CAGGGTCCGAACAGGAGAGCGCACGAGGAGCTTCCAGGGGAAACGCTTGGTATCTTTATAGTCTGTGCGGTTTCGCC
ACCTCTGACTTGAGCGTCGATTTTGTGATGCTCGTCAGGGGGCGGAGCCTATGGAAAAACGCCAGCAACGCGGCTTT
TTACGGTTCTGCGCTTTTGTGCTGGCTTTTGTCTCACATGTTCTTTCTGCGTTATCCCCTGATTCTGTGGATAACCGTAT
TACCGCCTTTGAGTGAGCTGATACCGCTCGCCGAGCCGACGAGCGAGTCAGTGAGCGAGGAAGCGGAAG
AGCGCTGATGCGGTATTTCTCCTTACGCATCTGTGCGGTATTTACACCGCATATGGTGCACTCTAGTACATCTGCG
TCTGATGCCGCATAGTTAAGCCAGTATACACTCCGCTATCGCTACGTGACTGGGTATGGCTGCGCCCCGACACCCGCCA
ACACCCGCTGACGCGCCCTGACGGCTTGTCTGCTCCCGCATCCGCTTACAGACAAGCTGTGACCGTCTCCGGGAGCTG
CATGTGTCAGAGGTTTTTACCGTTCATCACCGAACGCGCAGGCGAGCTGCGGTAAAGCTCATCAGCGTGGTCTGTGAAGCG
ATTACAGATGCTGCTGTTTCATCCGCTCCAGCTCGTTGAGTTTCTCCAGAAGCGTTAATGTCTGGCTTCTGATAAAG
CGGGCCATGTTAAGGGCGGTTTTTCTGTTTGGTCACTTGATGCCTCCGTGAAGGGGAATTTCTGTTTATGGGGTA
ATGATACCGATGAAACGAGAGAGGATGCTCACGATACGGGTTACTGATGATGAACATGCCCCGTTACTGGAACGTTGTGA
GGGTAAACAACCTGGCGGTATGGATGCGCGGGACAGAGAAAAATCACTCAGGGTCAATGCCAGCGCTTCGTTAATACAG
ATGTAGGTGTTCCACAGGGTAGCCAGCAGCATCCTGCGATGACAGATCCGGAACATAATGGTGACGGCGCTGACTTCCG
GTTTCCAGACTTACGAAACACGGAACCGAAGACCATTATGTTGTTGCTCAGGTGCGAGACGTTTTCAGCAGCAGTC
GCTTCACGTTTCGCTCGGTATCGGTGATTCATTCTGCTAACCAGTAAGGCAACCCCGCAGCTAGCCGGTCTCAACG
ACAGGAGCACGATCATGCGACCCGTTGCCAGGACCAACGCTGCCCCAGATGCGCCCGTGGCTGGAGATGGCG
GACGCGATGGATATGTTCTGCCAAGGGTTGGTTTGCGCATTACAGTTTCTCCGCAAGAATTGATTGGCTCCAATTTCTGG
AGTGGTGAATCCGTTAGCGAGGTGCCCGCGCTTCCATTACAGTCAAGGTGAGGTGCGCCGCTCCATGACCCGACGCAACGC
GGGAGGCGAGACAAGGTATAGGGCGGCGCTTACAATCCATGCCAACCCTTCCATGTGCTGCGCGAGGCGGATAAATCG
CCGTGACGATCAGCGGTCCAGTGATCGAAGTTAGGCTGGTAAGAGCCGCGAGCGATCCTTGAAGCTGTCCCTGATGGTGC
TCATCTACCTGCTGACAGCATGGCTGCAACGCGGGCATCCCGATGCCCCGGAAGCGAGAAGAATCATAATGGGGAA
GGCCATCCAGCCTCGCGTCGCGAACGCCAGCAAGACGTAGCCCAGCGCTCGGCCGCTATGCCGCGGATAATGGCCTGCT
TCTCGCCGAAACGTTTGGTGGCGGACAGTGACGAAGGCTTGAAGGAGGCGTGAAGATTCCGAATACCGCAAGCGAC
AGGCCGATCATCGTCGCTCCAGCGAAAGCGGTCTCGCCGAAATGACCCAGAGCGCTGCCGCGACCTGTCTACGAG
TTGCATGATAAAGAAGACAGTCATAAGTGCGGCGACGATAGTCACCCGCGCCACCGGAAGGAGCTGACTGGGTTGA
AGGCTCTCAAGGGCATCGGTGAGATTTAGGTGACACTATA

FIG. 13-1

GTATTTTACAACAATTACCAACAACAACAAACAGACAACATTACAATTACTATTTACAATTACAATGGCATACACA
CAGACAGCTACCACATCAGCTTGTCTGGACACTGTCCGAGGAAACAACCTCCTTGGTCAATGATCTAGCAAAGCGTCGTCT
TTACGACACAGCGGTTGAAGAGTTTAAACGCTCGTGACCGCAGGCCCAAGGTGAACCTTTCAAAGTAATAAGCGAGGAGC
AGACGCTTATTGCTACCCGGGCGTATCCAGAATCCAAATTACATTTTATAACACGCAAAATGCCGTGCATTTCGCTTGCA
GGTGGATTGCGATCTTTAGAACTGGAATATCTGATGATGCAAAATCCCTACGGATCATTGACTTATGACATAGCGGGAA
TTTTGCATCGCATCTGTTCAAGGGACGAGCATATGTACAGTCTGTCATGCCCAACCTGGACGTTTCGAGACATCATGCGGC
ACGAAGGCCAGAAAGACAGTATTGAACATATACCTTTCTAGGCTAGAGAGAGGGGGGAAAACAGTCCCAACCTTCCAAAAG
GAAGCATTGACAGATACGCAGAAATTCCTGAAGACGCTGTCTGTCAACAATCTTTCCAGACATGCCAACATCAGCCGAT
GCAGCAATCAGGCAGAGTGTATGCCATTGCGCTACACAGCATATATGACATACCAGCCGATGAGTTCGGGGCGGCACCTCT
TGAGGAAAAATGTCCATACGTGCTATGCCGCTTCCACCTTCCGAGAACCTGCTTCTGAAGATTTCGCGTCAATTTG
GACGAAATCAACGCGTGTCTTTTCGCGCGATGGAGACAAGTTGACCTTTTCTTTGTCATCAGAGAGTACTCTTAATTACTG
TCATAGTTATTCTAATATTCTTAAGTATGTGTGCAAACTTACTTCCCGGCCTCTAATAGAGAGGTTTACATGAAGGAGT
TTTTAGTCACAGAGTTAATACCTGGTTTGTAGTTTCTAGAATAGATACTTTCTTTTGTACAAAGGTGTGGCCCAT
AAAAGTGTAGATAGTGAGCAGTTTATACTGCAATGGAAGACGCATGGCATTACAAAAAGACTCTTGCAATGTGCAACAG
CGAGAGAAATCCTCCTTGGGGATTTCATCATAGTCAATTACTGGTTTCCCAAAATGAGGGATATGGTTCATCGTACCATTAT
TCGACATTTCTTTGGAGACTAGTAAGAGGACGCGCAAGGAAGTCTTAGTGTCCAAGGATTTCTGTGTTACAGTGTCTTAAC
CACATTCGAACATACCAGGCCAAAGCTCTTACATACGCAAAATGTTTGTCTTCGTGCAATCGATTTCGATCGAGGTAAT
CATTAAAGGTGTGACAGCGAGGTCGCAATGGGATGTGGACAATCTTTGTTACAATCCTTGTCATGACGTTTACCTGTC
ATACTAAGCTTGCCGTTCTAAAGGATGACTTACTGATTAGCAAGTTTAGTCTCGGTTGCAAAACGGTGTGCCAGCATGTG
TGGGATGAGATTTGCTGCGCTTTGGGAACGCATTTCCCTCCGTGAAAGAGAGGCTCTTGAACAGGAACTTATCAGAGT
GGCAGGCGAGCATTAGAGATCAGGGTGCCTGATCTATATGTGACCTTCCACGACAGATTAGTGACTGAGTACAAGGCT
CTGTGGACATGCCTGCGCTTGACATTAGGAAGAAGATGGAAGAAACGGAAGTGTGTAACAATGCATTTTCAAGATTATCG
GTGTTAAGGAGTCTGACAAATTCGATGTTGATGTTTTTCCAGATGTGCCAATCTTGGAAAGTTGACCAATGACCGGC
AGCGAAGGTTATAGTCGCGGTCTAGAGCAATGAGAGCGGTCTGACTCTCACATTTGAACGACCTACTGAGGCGAATGTTG
CGCTAGCTTTACAGGATCAAGAGAAGGCTTCAAGAGTGCATTGGTAGTTACCTCAAGAGAAGTTGAAGAACCGTCCATG
AAGGGTTCGATGGCCAGAGGAGATTACAATTAGCTGGTCTTGTCTGGAGATCATCCGGAATCGTCTATTCTAAGAACGA
GGAGATAGAGTCTTTAGAGCAGTTTCATATGGCGACGCGAGATTCTGTTAATTCGTAAGCAGATGAGCTCGATTGTGTACA
CGGGTCCGATTAAAGTTCAAGCAATGAAAACTTTATCGATAGCCTGGTAGCATCACTATCTGCTGCGGTGTGCAATCTC
GTCAAGATCCTCAAAGATACAGCTGCTATTGACCTTGAACCCCGTCAAAAGTTTGGAGTCTTGGATGTTGCATCTAGGAA
GTGGTTAATCAAACCAACGCGCAAGAGTCAATGATGGGGTGTGTTGAAACCCACGCGAGGGAGTATCATGTGGCGCTTT
TGGAATATGATGAGCAGGGTGTGGTGACATGCGATGATTGGAGAAGAGTAGCTGTTAGCTCTGAGTCTGTTGTTTATTCC
GACATGGCGAACTCAGAACTCTGCGCAGACTGCTTCGAAACGAGAACCCGATGTGATGAGCGCAAGGTTGTTCTTGT
GGACGGAGTTCGGGCTGTGAAAAAACCAAGAAATCTTCCAGGGTTAATTTGATGAAGATCTAATTTTAGTACCTG
GGAAGCAAGCCGCGAAATGATCAGAAGACGTGCGAATTCCTCAGGGATTATTGTGGCCACGAAGGACAACGTTAAACC
GTTGATCTTTTCATGATGAATTTTGGGAAAAGCACACGCTGTGAGTTCAAGAGGTTATTCAATGATGAAGGGTTGATGTT
GCATACTGGTTGTGTTAATTTCTTGTGGCGATGTCAATGTGCGAAATTCATATGTTTACGGAGACACACAGCAGATT
CATACATCAATAGAGTTTTCAGGATTCCCGTACCCCGCCATTTTCCCAAATTGGAAGTTGACGAGGTGGAGACACGAGA
ACTACTCTCCGTTGTCAGCCGATGTACACATTATCTGAACAGGAGATATGAGGGCTTTGTCATGAGCACTTCTTCGGT
TAAAAAGTCTGTTTCGAGGAGATGGTCCGCGGAGCCCGGTGATCAATCCGATCTCAAAACCTTGCATGGCAAGATCC
TGACTTTTACCAATCGGATAAAGAAGCTCTGCTTTCAAGAGGGTATTTCAGATGTTTCACTGTGCATGAAGTGAAGGC
GAGACATACTCTGATGTTTCACTAGTTAGGTTAACCCCTACACCGGTCTCCATCATTGCAGGAGACAGCCCATGTTTT
GGTGCATGTGCAAGGCACACCTGTTGCTCAAGTACTACACTGTGTTATGGATCCTTTAGTTAGTATCATTAGAGATC
TAGAGAAACTTAGCTCGTACTGTTAGATATGTATAAGGTCGATGAGGAACAATAGCAATTACAGATTGACTCGGTG
TTCAAAGGTTCCAATCTTTTGTGTCAGCGCAAGAGCTGGTGAATTTCTGATATGCAGTTTACTATGATAAGTGTCT
CCCAGGCAACAGCACCATGATGAATAATTTGATGCTGTTACCATGAGGTTGACTGACATTTCAATTGAATGTCAAAGATT
GCATATTGGATATGCTAAGTCTGTTGCTGCACCTAAGGATCAAATCAAACCTAATACCTATGGTACGAACGGCGGCA
GAAATGCCACGCCAGACTGGACTATTGGAAAAATTTAGTGGCGATGATTAAGAAAGAACTTTAACGCACCCGAGTTGTCTGG
CATCATTGATATTGAAAAACTGCATCTTTGGTTGTAGATAAGTTTTTGTAGTTATTTGCTTAAAGAAAAAGAAAAAC
CTCGCAGATTTTGAATTTGTGGATTTGCCAGCAGTTGATCAGTACAGACATGATTAAAGCACAACCCAAACAAAGTT
GGACACTTCAATCCAAACGGAGTACCCGGCTTGCAGACGATGTGTACCATTCAAAAAAGATCAATGCAATATTTCGGCC
CGTTGTTTGTAGTACTTAGGCAATTAAGTGCAGTGTGATTTCGAGCAGATTTTGTGTTTTTCAAGAAAGACACCA
GCGCAGATTGAGGATTTCTTCGAGATCTCGACATCATGTGCCGATGGATGTCTTGGAGCTGGATATATCAAAATACGA

FIG. 13-2

CAAATCTCAGAATGAATTCCACTGTGCAGTAGAATACGAGATCTGGCGAAGATTGGGTTTCGAAGACTTCTTGGGAGAAG
TTTGGAAACAAGGGCATAGAAAGACCACCTCAAGGATTATACCGCAGGTATAAAACTTGCATCTGGTATCAAAGAAA
AGCGGGGACGTCACGACGTTCAATTGGAAACACTGTGATCATTGCTGCATGTTTGGCCTCGATGCTTCCGATGGAGAAA
AATCAAAGGAGCCTTTTGGGTGACGATAGTCTGCTGTACTTTCCAAAGGGTTGTGAGTTTCCGGATGTGCAACACTCCG
CGAATCTTATGTGGAATTTTGAAGCAAACTGTTTAAAAAACAGTATGGATACTTTTGGCGAAGATATGTAATACATCAC
GACAGAGGATGCATTGTGTATTACGATCCCTTAAAGTTGATCTCGAACTTGGTGCTAAACACATCAAGGATGGGAACA
CTTGGAGGAGTTCAGAAGGTCTCTTGTGTGTTGCTGTTTCGTTGAACAATTGTGCGTATTACACACAGTTGGACGACG
CTGTATGGGAGGTTTATAAGACCGCCCTCCAGGTTTCGTTTGTATATAAAAGTCTGGTGAAGTATTTGTCTGATAAAAGT
CTTTTTAGAAAGTTTGTATAGATGGCTCTAGTTGTAAAGGAAAAGTGAATATCAATGAGTTTATCGACCTGACAAAA
TGGAGAAGATCTTACCGTCGATGTTTACCCCTGTAAAGAGTGTTATGTGTTCCAAAGTTGATAAAATATGGTTCATGAG
AATGAGTCATTGTGAGGGGTGAACCTTCTTAAAGGAGTTAAGCTTATTGATAGTGGATACGTCTGTTTAGCCGGTTTGGT
CGTCACGGGCGAGTGGAACTTGCCTGACAATTGACAGAGGAGGTGTGAGCGTGTGTCTGGTGGACAAAAGGATGGAAAGAG
CCGACGAGGCCATTCGCGATCTTACTACACAGCAGCTGCAAGAAAAGATTTCAGTTCAAGGTCGTTCCCAATTATGCT
ATAACCACCCAGGACGCGATGAGAAACGTCTGGCAAGTTTGTAGTTAATATTAGAAATGTGAAGATGTGAGCGGGTTTCTG
TCCGCTTCTCTGGAGTTTGTGTGCGGTGTGATTGTTTATAGAAATAATATAAAATTAGGTTTGAGAGAGAAGATTACAA
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CTTGCAAAGTTTCGATCTCGAACCGGAAAAAGAGTGATGTCGCAAGGGAAGAAATAGTAGTAGTGATCGGTGAGTGCC
GAACAAGAACTATAGAAATGTAAAGGATTTTGGAGGAATGAGTTTAAAAAGAAATAATTAAATCGATGATGATTGCGAGG
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cttcaggcagaccctcagcgcttccctaatgggattcgccagctagctaattatgttcacagcaaggactgaagctagg
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TCCCTCCACTTAAATCGAAGGGTTGTGCTTGGATCGCGGGGTCAAATGTATATGGTTTATATACATCCGACGACG
AATAAAGCGAGGGGTTCCGGTTCGAGGTGCGCTGTGAACTCGAAAAGGTTCCGGAAAAACAAAAAGAGAGTGGTAGGTAA
TAGTGTTAATAATAAGAAAAATAATAATAGTGGTAAGAAAGGTTTGAAGTTGAGGAAATTGAGGATAATGTAAGTGATG
ACGAGTCTATCGCGTCATCGAGTACGTTTAAATCAATATGCTTATACAATCAACTCTCCGAGCCAATTGTGTTACTTAA
GTTCCGCTTATGCAGATCCTGTGCAGCTGATCAATCTGTGTACAAATGCATTGGGTAAACGAGTTTCAAACGCAACAAGCT
AGGACAACAGTCCACAGCAATTTGCGGATGCCTGGAAACCTGTGCCTAGTATGACAGTGAGATTTCTGCATCGGATTT
CTATGTGTATAGATATAATTGACGCTTGTATCCGTTGATCACGCGCTTATTAATAGCTTCGATACTAGAAATAGAAATA
TAGAGGTTGATAATCAACCCGACCGAATACTACTGAAATCGTTAACGCGACTCAGAGGTTAGACGATGCGACTGTAGCT
ATAAGGGCTTCAATCAATAATTGGCTAATGAACTGGTTCGTGGAACCTGGCaTGTTCATCAAGCAAGCTTTGAGACTGC
TAGTGGACTTGTCTGGACCACAACCTCCGGCTACTTAGctattgtgtgagatttccataaaataaagtcaactgaagactta
aaattcagggtggctgataccaaaatcagcagtggtgttgcctccacttaaatataacgattgtcatatctggatccaac
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TRANSGENIC VECTOR FOR rGCB EXPRESSION

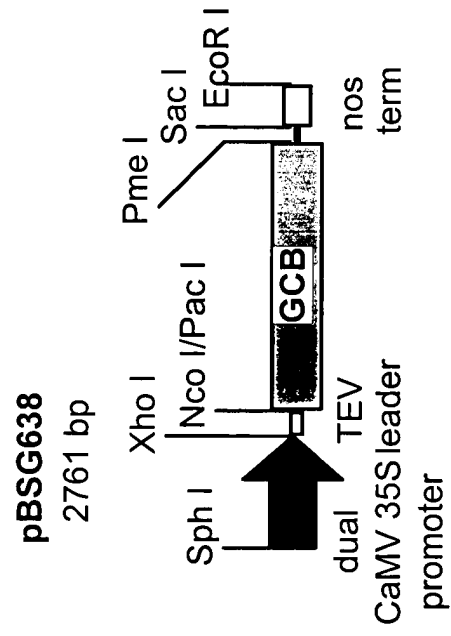


FIG. 14

VIRAL VECTOR FOR rGCB EXPRESSION

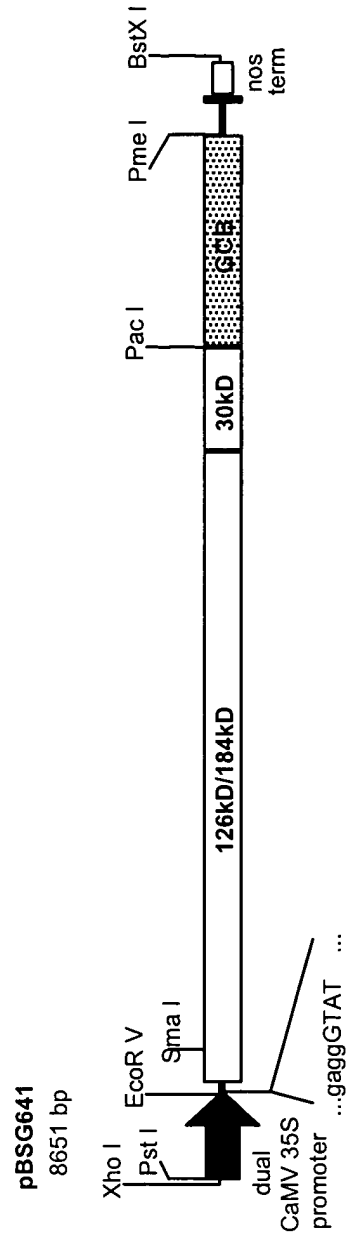


FIG. 15